

# Active Labour Market Programmes, Education and Unemployment\*

Yoshihiko Fukushima<sup>†</sup>  
Department of Economics  
Stockholm University

June 12, 2001

## Abstract

The paper formalises the interaction between active labour market programmes and ordinary higher education in a general equilibrium framework. Both education in programmes and ordinary higher education serve to increase the supply of high-skilled labour. The model features a dual labour market where wages and employment are determined by labour-demand and wage-setting schedules. Programmes are shown to have crowding-out effects on both regular employment and the number of students in ordinary higher education. Numerical calibrations of the model show that social welfare is lower in an economy with educational programmes than in an economy without such programmes.

Keywords: Active labour market programme, education, unemployment, dual labour market, welfare

JEL classification: J31, J41, J64, J68, R13

---

\*I am grateful for many useful suggestions by Lars Calmfors, Assar Lindbeck, and Harald Lang, and to participants in seminars at Stockholm University. I would also like to thank participants at the Latin American and Caribbean Economic Association Conference in Santiago, October 1999.

<sup>†</sup>Department of Economics, Stockholm University, S-106 91 Stockholm, Sweden Phone: +46-8-164242; Fax: +46-8-159482; E-mail: ff@ne.su.se

# 1 Introduction

The employment experiences in Western Europe seem to show that unemployment has an important structural component that cannot be handled by demand policies only. This explains why supply-side policies have been recommended by many analyses (OECD, 1994; Alogoskoufis et al., 1995; Calmfors et al., 1998; Modigliani et al., 1998). One such supply-side policy, which has been advocated especially by the OECD and the EU commission and which has been put to use in many European countries, is active labour market policies.

Active labour market programmes (henceforth denoted ALMPs) have the longest tradition and have been used most extensively in Sweden. Labour market training and various job creation schemes were emphasised strongly during the recession in the 1990s. The main aims of ALMPs are to adapt the skills of the unemployed to the demands by employers and to maintain the effective supply of labour by preventing the unemployed from dropping out of the labour force (Wadensjö, 1987; Lindbeck, 1995; European Commission, 1996; OECD, 1998).

Recently ALMPs in Sweden have been shifting in the direction of providing the unemployed with the same general skills as those are taught in the ordinary education system (the so-called *Adult Education Initiative*, the Swedish name of which is *Kunskapslyftet*) (SFS, 1998). This is in contrast with the traditional system of labour market training (the Swedish name of which is *Arbetsmarknadutbildning*), which has aimed at providing more specific vocational skills. There is a similar trend in other countries, too (OECD, 1994; OECD, 1998).

The tendency to shift active labour market policy in the direction of general education motivates a study of the general equilibrium effects on unemployment and education. The paper compares the effects of higher education for young people with the effects of educational programmes targeted on the unemployed. I shall look at education above the level of standard education. In my model such higher education

can be obtained either because young people continue to study immediately after standard education or because they participate in ALMPs as the unemployed later in life. Both types of higher education tend to increase the supply of high-skilled labour. But ordinary higher education (henceforth denoted OHE) and general education for the unemployed in ALMPs should give rise to different welfare effects in several dimensions. First, ALMPs involving general education offer a later possibility for workers to increase their productivity and thus tend to raise the welfare of unskilled workers. A second difference between ALMPs and OHE has to do with the costs. OHE is in general more costly for individuals. The participants in ALMPs usually receive compensation which corresponds to unemployment benefits. Financial support for students in OHE is usually less, and in some countries students also have to pay some parts of educational costs. Because of these differences, ordinary education and educational programmes should be expected to affect unemployment and social welfare in different ways. However, there are neither theoretical nor empirical studies that analyse the difference in macroeconomic effects between ALMPs and OHE. This paper aims to fill this gap.

One crucial question concerns how educational programmes for the unemployed will interact with ordinary education. New graduates from standard education have the alternative of going to higher education before they enter the labour market or entering the labour market as unskilled job seekers. Unskilled job seekers may have a future opportunity to participate in ALMPs. New graduates compare the welfare of studying in OHE with the welfare of becoming an unskilled job seeker and decide where to go. If a larger number of new graduates decide to continue studying in OHE, the number of participants in ALMPs may be smaller because there are fewer unskilled workers in the labour market. And if the size of ALMPs is expanded, the return to OHE will be reduced and the outcome is likely to be a lower enrolment in OHE. Ordinary education may thus be crowded out by an expansion of

educational programmes. Most earlier studies have been concerned primarily with the relationship between ALMPs and regular employment. Much less interest has been devoted to the crowding-out effect of ALMPs on ordinary education and no study has formally discussed this effect. This paper investigates how an expansion of ALMPs focusing on general education affects both regular employment and the size of higher education.

The next section of the paper sets out the basic model. Section 3 demonstrates how an expansion of ALMPs affects macroeconomic variables, i.e. employment, unemployment, the number of students in OHE, the total skilled labour force, the aggregate profit, and the tax rate. In section 4 the effect of ALMPs on social welfare is analysed by means of numerical simulations. Section 5 concludes.

## 2 The model

The paper uses a two-sector general equilibrium model along the lines sketched in Fukushima (1998). There are two types of labour: skilled labour in a high-productivity sector (henceforth denoted the HP-sector) and unskilled labour in a low-productivity sector (henceforth denoted the LP-sector). ALMPs educate unskilled unemployed workers and transform them to skilled ones. After educational programmes, workers enter the HP-sector as job seekers. OHE instead transforms new graduates from standard education to skilled job seekers, who can enter the HP-sector when they complete higher education. I shall assume that ALMPs and OHE transform the participants into skilled workers in the same way and the productivity of skilled labour is maintained permanently.

Wages and employment are determined by the intersection of an employment schedule and a wage-setting schedule. A Nash bargaining model of the same type as in Manning (1993) is used to define a wage-setting relationship in the HP-sector. The wage in the LP-sector is given by the legislated minimum wage.

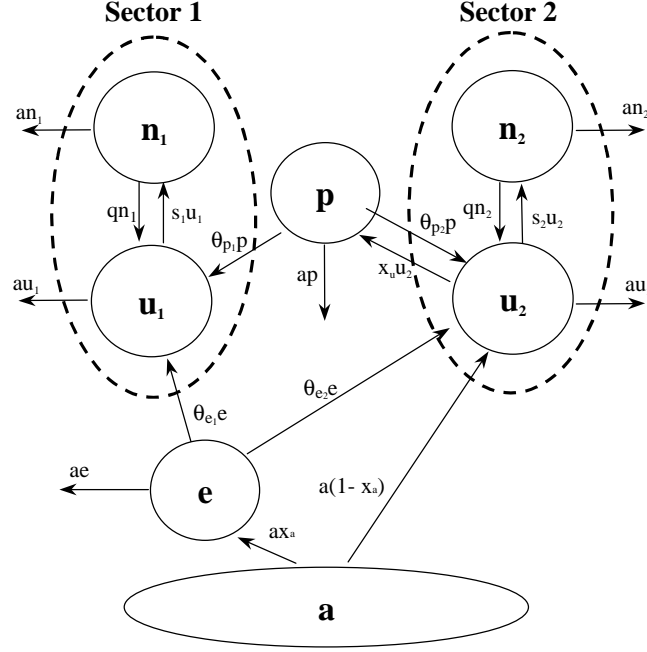


Figure 1: Labour market flows

## 2.1 Labour market flows and stocks

In my model, sector 1 is the HP-sector and sector 2 the LP-sector. The various stocks and flows of labour are summarised in Figure 1. I assume that the economy finds itself in a steady state and that thus all stocks are constant. I postulate a stationary “population” (i.e., “grown-ups” that could either work or study in higher education) which is normalised to unity.

Individuals leave the population at a constant rate  $a$ , which is exactly the same rate as the rate of entry into the population. The new entrants,  $a$ , is new graduates from standard education. New graduates have two alternatives: (i) to study in OHE; or (ii) to enter the labour market as unskilled job seekers. I denote the fraction of the first category above  $x_a$ , which is determined endogenously.

The share of the population in OHE is  $e$ . A fraction  $\theta_{e1}$  of them is assumed to graduate and enter the skilled unemployment pool. A fraction  $\theta_{e2}$  of them drops

out and enters the LP-sector as job seekers. The steady state condition for OHE is

$$(a + \theta_{e_1} + \theta_{e_2}) e = x_a a. \quad (1)$$

The share of the population in ALMPs is  $p$ . Participants are selected from unskilled unemployed workers with the probability  $x_u$ . A fraction  $\theta_{p_1}$  of them is assumed to complete ALMPs and become skilled job seekers. A fraction  $\theta_{p_2}$  of them drops out and goes back to the LP-sector. The steady state condition for ALMPs is

$$(a + \theta_{p_1} + \theta_{p_2}) p = x_u u_2, \quad (2)$$

where  $u_i$  is unemployment in sector  $i$  ( $i = 1, 2$ ).

I assume that  $\theta_{e_1} \geq \theta_{p_1}$  and  $\theta_{e_2} \leq \theta_{p_2}$ . The motivation of these assumptions is that younger individuals are in general more flexible and capable of studying new things than older persons.

The steady state condition for constant employment in sector  $i$  ( $n_i$ ) is

$$(a + q)n_i = s_i u_i, \quad (3)$$

where  $q$  is the exogenously given quit rate from employment and  $s_i$  is endogenously determined probability to get a job in sector  $i$ .

The conditions for constant unemployment in both sectors are

$$(a + s_1)u_1 = qn_1 + \theta_{e_1}e + \theta_{p_1}p, \quad (4)$$

$$(a + s_2 + x_u)u_2 = (1 - x_a)a + qn_2 + \theta_{e_2}e + \theta_{p_2}p. \quad (5)$$

I let  $m_i$  denote the total labour force in sector  $i$ , i.e.  $m_i = n_i + u_i$ . From (1) - (5), the labour force in both sectors can be expressed:

$$m_1 = \frac{1}{a} (\theta_{e_1}e + \theta_{p_1}p), \quad (6)$$

$$m_2 = 1 - \frac{1}{a} [(a + \theta_{e_1})e + (a + \theta_{p_1})p]. \quad (7)$$

The parentheses of the RHS in (6) represents the labour flow into the HP-sector. A rise in the labour flow into the HP-sector increases the total labour force there.

I denote the sectoral employment rates (employment in sector  $i$  as a fraction of the share of labour force in the sector),  $n'_i$ , as

$$n'_i = \frac{n_i}{m_i}. \quad (8)$$

From (3) and (8), the probability to get a job in sector  $i$  can be written:

$$s_i = (a + q) \frac{n_i}{u_i} = (a + q) \frac{n'_i}{1 - n'_i}. \quad (9)$$

## 2.2 Determination of wages and employment

The employment schedules are derived from the ordinary profit maximisation behavior of firms.  $F$  identical firms in sector  $i$  produce a homogenous good through a decreasing-return-to-scale technology:  $y_i^* = A_i (n_i^*)^\alpha$ , where  $0 < \alpha < 1$ .  $y_i^*$  and  $n_i^*$  are the output and employment in each firm of sector  $i$ , respectively.  $A_i$  represents productivity in sector  $i$ , where  $A_1 > A_2$ . The relative price of the products is assumed to be given by the international market and is normalised to unity. Each firm maximises the profit,  $\pi_i^* = y_i^* - w_i^* n_i^*$ , where  $w_i^*$  is the real wage in each firm of sector  $i$ . The first-order condition gives  $w_i^* = \alpha A_i (n_i^*)^{\alpha-1}$ . Since  $n_i^* = n_i/F$  and  $w_i^* = w_i$  in a symmetrical equilibrium, the aggregate labour-demand schedule in sector  $i$  can be written:

$$w_i = B_i n_i^{\alpha-1}, \quad (10)$$

where  $B_i = \alpha A_i F^{2-\alpha} > 0$ . Since  $dw_i/dn_i < 0$  and  $d^2w_i/dn_i^2 < 0$ , the labour-demand curves are downward-sloping and convex. The labour-demand elasticity is constant and equal to  $1/(1 - \alpha)$ .

I turn now to the wage-setting schedule in the HP-sector. I shall assume that there are firm-specific unions so that one union is associated with each firm in the

HP-sector. Like in Manning (1991, 1993), each union attempts to maximise the union utility function ( $z^*$ ):

$$z_{(t)}^* = n_{1(t)}^* [\Omega_{n_1(t)}^* - \Omega_{u_1(t)}],$$

where  $\Omega_{n_1}^*$  the discounted value of employment in each firm of the HP-sector,  $\Omega_{u_1}$  the discounted value of unemployment in the HP-sector,  $t$  a time subscript.  $\Omega_{u_1}$  represents also the expected value of the alternative to workers who lose their jobs. This is because all workers who lose their jobs enter the unemployment pool in the same sector. Thus the bracket in the RHS represents the rent from employment. The union maximises the total rent for employed workers.

Workers are assumed to be risk neutral, so that an individual's instantaneous utility function,  $V$ , can be written as  $V(I) = I$ , where  $I$  is the after-tax income. I normalise the value of leaving the labour market to zero. Thus the value of employment in each firm of sector 1 is

$$\Omega_{n_1(t)}^* = \frac{1}{1+r} [(1-\tau) w_{1(t)}^* + q\Omega_{u_1(t+1)} + (1-a-q)\Omega_{n_1(t+1)}^*], \quad (11)$$

where  $\tau$  is a tax rate. The value of being unemployed in sector 1 is

$$\Omega_{u_1(t)} = \frac{1}{1+r} [(1-\tau) b_{u_1(t)} + s_1\Omega_{n_1(t+1)} + (1-a-s_1)\Omega_{u_1(t+1)}], \quad (12)$$

where  $b_{u_i}$  is the unemployment benefit in sector  $i$ .

The wage,  $w_{1(t)}^*$ , is set so as to maximise a Nash bargain where the fall-back position of both the union and the firm is zero, i.e.

$$\max_{w_{1(t)}^*} \Psi = (z_{(t)}^*)^\beta (\pi_{1(t)}^*)^{1-\beta},$$

where  $\beta$  is the bargaining power of the union. Like Manning (1993) I assume that wages are determined for one period only. Hence the current wage,  $w_{1(t)}^*$ , will not affect the values of future employment in the firm and future unemployment, i.e.  $\Omega_{n_1(t+1)}^*$  and  $\Omega_{u_1(t+1)}$ . As I shall be analysing a steady state, I can drop all time



subscripts. Since  $w_{1(t)}^* = w_1$  in a symmetric equilibrium, the first-order condition gives

$$w_1 = \frac{(1+r)\mu}{(1+r)\mu - (a+r+q+s_1)} b_{u_1},$$

where  $\mu = \eta_N + [(1-\beta)/\beta]\eta_\pi$ .  $\eta_N$  and  $\eta_\pi$  are the elasticities of employment and profits respectively w.r.t. the wage in each firm, i.e.  $\eta_N = 1/(1-\alpha)$  and  $\eta_\pi = \alpha/(1-\alpha)$ . Hence the parameter  $\mu$  can be treated as an exogenous parameter. I assume that the replacement ratio is constant and the same in both sectors, i.e., that  $b_{u_i}/w_i = \rho$ . Taking (9) into account, the wage-setting schedule in the HP-sector can be expressed as

$$n_1 = \left[ \frac{(1+r)(1-\rho)\mu - (a+q)}{(1+r)(1-\rho)\mu - r} \right] m_1. \quad (13)$$

The wage-setting schedule in the HP-sector is vertical and employment is the function of the total labour force in the sector. Moreover, together with (8), the sectoral employment rate in the HP-sector ( $n'_1$ ) depends only on exogenously given parameters and it is constant. According to (9), the probability to get a job in the HP-sector ( $s_1$ ) is also constant.

The wage in the LP-sector ( $w_2$ ) is assumed to be given at the same legislated minimum wage level for all future periods, i.e.

$$w_2 = w_m, \quad (14)$$

where  $w_m$  is the legislated minimum wage<sup>1</sup>.

---

<sup>1</sup> It seems to be a stylised fact that employment varies less for skilled than for unskilled workers (Hamermesh, 1993; Card and Krueger, 1995; Brown, 1999). A simple way to capture this stylised fact is to assume a vertical wage-setting schedule for the skilled workers and a horizontal wage-setting schedule for the unskilled.

### 2.3 The present values of various states

The present values of being employed and unemployed in the HP-sector are explicitly derived from (11) and (12) as

$$\Omega_{n_1} = (1 - \tau) \Phi_{n_1}, \quad (15)$$

$$\Omega_{u_1} = (1 - \tau) \Phi_{u_1}, \quad (16)$$

where

$$\Phi_{n_1} = w_1 \left[ \frac{a + r + s_1 + q\rho}{(a + r)(a + r + q + s_1)} \right], \quad (17)$$

$$\Phi_{u_1} = w_1 \left[ \frac{s_1 + (a + r + q)\rho}{(a + r)(a + r + q + s_1)} \right]. \quad (18)$$

The present values of being employed and unemployed in sector 2,  $\Omega_{n_2(t)}$  and  $\Omega_{u_2(t)}$ , are

$$\Omega_{n_2(t)} = \frac{1}{1 + r} [(1 - \tau) w_m + q\Omega_{u_2(t+1)} + (1 - a - q)\Omega_{n_2(t+1)}], \quad (19)$$

$$\Omega_{u_2(t)} = \frac{1}{1 + r} \left[ \begin{aligned} &(1 - \tau) b_{u_2(t)} + s_2 \Omega_{n_2(t+1)} + x_u \Omega_{p(t+1)} \\ &+ (1 - a - s_2 - x_u) \Omega_{u_2(t+1)} \end{aligned} \right], \quad (20)$$

where  $\Omega_{p(t)}$  is the present value of participating in ALMPs.

Participants in ALMPs receive the same amount of compensation as the unemployment benefit for unskilled labour. The present value of participating in ALMPs is

$$\Omega_{p(t)} = \frac{1}{1 + r} \left[ \begin{aligned} &(1 - \tau) b_{u_2(t)} + \theta_{p_1} \Omega_{u_1(t+1)} + \theta_{p_2} \Omega_{u_2(t+1)} \\ &+ (1 - a - \theta_{p_1} - \theta_{p_2}) \Omega_{p(t+1)} \end{aligned} \right]. \quad (21)$$

Students get the financial support,  $b_{e(t)}$ , from the government. The present value of studying in OHE,  $\Omega_{e(t)}$ , can be expressed as

$$\Omega_{e(t)} = \frac{1}{1 + r} \left[ \begin{aligned} &b_{e(t)} + \theta_{e_1} \Omega_{u_1(t+1)} + \theta_{e_2} \Omega_{u_2(t+1)} \\ &+ (1 - a - \theta_{e_1} - \theta_{e_2}) \Omega_{e(t+1)} \end{aligned} \right]. \quad (22)$$

The financial support is assumed to be smaller than the after-tax unemployment benefit for unskilled labour, i.e.  $b_{e(t)} = \gamma (1 - \tau) b_{u_2(t)}$ , where  $0 \leq \gamma < 1$ .

## 2.4 Determination of the size of higher education

New graduates from standard education have the alternative of studying in OHE or entering the LP-sector as job seekers. Thus they compare the value of studying in OHE with the value of being unemployed in the LP-sector and go where the value is higher. The size of OHE, i.e.  $x_a$ , is assumed to be determined in a such way as to satisfy

$$\Omega_{e(t)} = \Omega_{u_2(t)}. \quad (23)$$

When  $\Omega_{e(t)} = \Omega_{u_2(t)}$  is satisfied, it follows from (16), (18), (22) that the value of studying in OHE in a steady state can be expressed:

$$\Omega_e = (1 - \tau) \Phi_e, \quad (24)$$

where

$$\Phi_e = \frac{1}{a + r + \theta_{e_1}} (\gamma \rho w_m + \theta_{e_1} \Phi_{u_1}). \quad (25)$$

The value of studying in OHE is positively related to the value of being unemployed in the HP-sector. This is because students become skilled job seekers after they complete their education.

From (21), (23), (24), (25), and the assumption of a steady state, the value of participating in ALMPs is

$$\Omega_p = (1 - \tau) \Phi_p, \quad (26)$$

where

$$\Phi_p = \frac{1}{a + r + \theta_{p_1} + \theta_{p_2}} \left[ \left( 1 + \frac{\theta_{p_2}}{a + r + \theta_{e_1}} \gamma \right) \rho w_m + \left( \theta_{p_1} + \frac{\theta_{p_2}}{a + r + \theta_{e_1}} \theta_{e_1} \right) \Phi_{u_1} \right]. \quad (27)$$

The value of participating in programmes also depends positively on the value of being unemployed in the HP-sector. The reason is that participants also become job seekers in the HP-sector if they finish their education in ALMPs.

When  $\Omega_{e(t)} = \Omega_{u_2(t)}$  is satisfied, it follows from (19), (20), (24), (25), (26), and (27) that the values of being employed and unemployed respectively in the LP-sector in a steady state are

$$\Omega_{n_2} = (1 - \tau) \Phi_{n_2}, \quad (28)$$

$$\Omega_{u_2} = (1 - \tau) \Phi_{u_2}, \quad (29)$$

where

$$\Phi_{n_2} = \frac{(a + r + s_2) w_m + q [\rho w_m + x_u (\Phi_p - \Phi_e)]}{(a + r) (a + r + q + s_2)}, \quad (30)$$

$$\Phi_{u_2} = \frac{s_2 w_m + (a + r + q) [\rho w_m + x_u (\Phi_p - \Phi_e)]}{(a + r) (a + r + q + s_2)}. \quad (31)$$

Now I impose two restrictions. First, I assume that the value of participating in an ALMP is greater than or equal to the value of being unemployed in the LP-sector, i.e.  $\Omega_p \geq \Omega_{u_2}$ . This is an incentive compatibility constraint. Since participants in ALMPs are selected from unskilled unemployed workers, it must hold that  $\Omega_p \geq \Omega_{u_2}$ . Otherwise, no unemployed worker in the LP-sector would accept to participate in programmes. Secondly, in the LP-sector, the value of being employed is assumed to be greater than or equal to the value of being unemployed, i.e.  $\Omega_{n_2} \geq \Omega_{u_2}$ . Otherwise, the unemployed in the LP-sector do not take a job.

## 2.5 The budget constraint

The tax rate is determined by the balanced budget requirement. It is assumed that taxes are levied on all workers in the economy and no tax is levied on the profit of firms. Taxes are used to finance the unemployment benefit, financial support for students in OHE, and the costs of education. The tax rate can thus be written:

$$\tau = \frac{u_1 w_1 \rho + (u_2 + e\gamma + p) \rho w_m + (e + p) k}{n_1 w_1 + n_2 w_m + u_1 w_1 \rho + (u_2 + e\gamma + p) \rho w_m}, \quad (32)$$

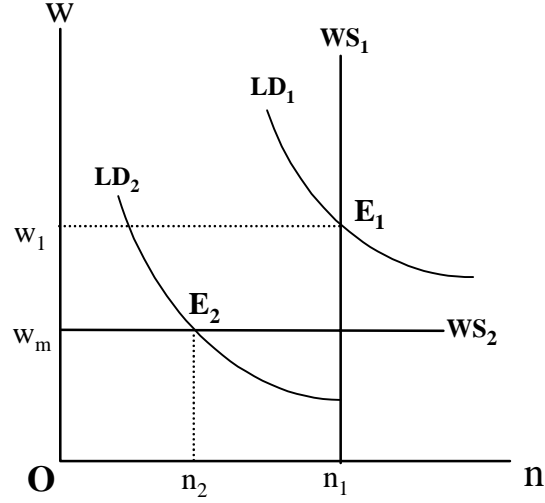


Figure 2: Labour market equilibrium

where  $k$  denotes the per capita cost of providing education in ALMPs and providing OHE. The denominator in (32) is tax revenues and the numerator is the expenditure on unemployment, ALMPs and OHE.

## 2.6 Equilibrium

Figure 2 illustrates the general-equilibrium solution of the model. Wages are measured along the vertical axis and employment along horizontal axis. The negative sloped labour-demand curves in the two sectors are given by (10). The vertical wage-setting schedule in the HP-sector is given by (13). The horizontal wage-setting relation in the LP-sector is given by (14). In this diagram, the equilibrium for the HP-sector is  $E_1$  and for the LP-sector  $E_2$ . As can be seen from (10), (13), and (14), the equilibrium in the labour market is independent of the tax rate. This is because the tax rate does not interact with macroeconomic variables and can be determined recursively.

### 3 Comparative statics

I shall examine the effects of a change in the share of population in ALMPs, i.e.  $p$ , which is the labour market policy parameter decided by the government. First, I investigate the effects on macroeconomic variables, i.e. employment, unemployment, and the number of students in OHE. Second, I discuss the effects on the aggregate profit and thirdly the impact on the tax rate.

#### 3.1 The effects on macroeconomic variables

As can be seen from (10) and (14), the labour-demand curves in both sectors and the wage-setting schedule in the LP-sector are not affected by a change in the size of ALMPs. Thus a change in  $p$  has no impact on the wage and employment in the LP-sector. An expansion of  $p$  affects the wage and employment in the HP-sector through the wage-setting schedule. More precisely, the effects on employment in both sectors are derived from (10), (13), and (14) as

$$\frac{dn_1}{dp} = n'_1 \left( \frac{dm_1}{dp} \right), \quad (33)$$

$$\frac{dn_2}{dp} = 0, \quad (34)$$

where

$$\frac{dm_1}{dp} = \frac{1}{a} \left[ \theta_{e_1} \frac{de}{dp} + \theta_{p_1} \right]. \quad (35)$$

Equation (33) shows that employment and the total labour force in the HP-sector are changed proportionally. The reason is that the sectoral employment rate in the sector is constant. Equation (34) confirms that there is no impact on employment in the LP-sector. This is because the wage in the sector is given by the minimum wage and thus employment is constant. However, the sectoral employment rate in the LP-sector ( $n'_2$ ) is affected by a change in  $p$ . It follows from (7), (8), and (34)

that

$$\frac{dn'_2}{dp} = -\frac{n'_2}{m_2} \left( \frac{dm_2}{dp} \right), \quad (36)$$

where

$$\frac{dm_2}{dp} = -\frac{1}{a} \left[ (a + \theta_{e_1}) \frac{de}{dp} + (a + \theta_{p_1}) \right]. \quad (37)$$

The effect on  $n'_2$  is positively related to the effect on the total unskilled labour force, i.e.  $dm_2/dp$ . Since unskilled employment is constant, an increase in the total labour force implies a reduction in the sectoral employment rate.

Substituting (24) and (29) into (23) and differentiating w.r.t.  $p$  gives  $d\Phi_e/dp - d\Phi_{u_2}/dp = 0$ . Also using (9), (18), (25), (27), (31), (33), and (36), I obtain

$$\begin{aligned} \frac{d\Phi_e}{dp} - \frac{d\Phi_{u_2}}{dp} &= [(C_1 + C_5) \theta_{e_1} + (C_2 + C_4) (a + \theta_{e_1})] \frac{de}{dp} \\ &\quad - [C_3 + (C_1 + C_5) \theta_{p_1} + (C_2 + C_4) (a + \theta_{p_1})] = 0, \end{aligned} \quad (38)$$

where

$$\begin{aligned} C_1 &= \frac{(1 - \alpha) w_1 \theta_{e_1} [s_1 + (a + r + q) \rho]}{a m_1 (a + r + \theta_{e_1}) (a + r) (a + r + q + s_1)} > 0, \\ C_2 &= \frac{s_2 (a + r + q) [(1 - \rho) w_m - x_u (\Phi_p - \Phi_{u_2})]}{a u_2 (a + r) (a + r + q + s_2)^2} > 0, \\ C_3 &= \frac{(a + r + q) (\Phi_p - \Phi_{u_2})}{u_2 (a + r) (a + r + q + s_2)} \geq 0, \\ C_4 &= \frac{(a + r + q) (\Phi_p - \Phi_{u_2}) p}{a u_2^2 (a + r) (a + r + q + s_2)} \geq 0, \\ C_5 &= \frac{(1 - \alpha) w_1 x_u (a + r) (\theta_{e_1} - \theta_{p_1}) [s_1 + (a + r + q) \rho]}{a m_1 (a + r + \theta_{p_1} + \theta_{p_2}) (a + r + \theta_{e_1}) (a + r + q + s_1)} \geq 0. \end{aligned}$$

Rearranging (38) gives

$$\frac{de}{dp} = -\frac{C_3 + (C_2 + C_4) (a + \theta_{p_1}) + (C_1 + C_5) \theta_{p_1}}{(C_2 + C_4) (a + \theta_{e_1}) + (C_1 + C_5) \theta_{e_1}} < 0. \quad (39)$$

An expansion of ALMPs thus *crowds* students *out* of ordinary education. Since an expansion of programmes tends to increase the value of being unemployed in

the LP-sector, it becomes more attractive for graduates from standard education to enter the LP-sector as job seekers and thus the number of students in OHE tends to be decreased.

Substituting (39) into (35), the effect on the total skilled labour force is

$$\frac{dm_1}{dp} = -\frac{C_3\theta_{e_1} + (C_2 + C_4)a(\theta_{e_1} - \theta_{p_1})}{a(C_2 + C_4)(a + \theta_{e_1}) + a(C_1 + C_5)\theta_{e_1}} < 0. \quad (40)$$

The total skilled labour force is decreased by an expansion of programmes. This is a striking and unexpected result. The explanation is the following. An expansion of ALMPs tends to increase the value of being unemployed in the LP-sector. To satisfy the equilibrium condition that  $\Omega_e = \Omega_{u_2}$ , the value of studying in OHE must also increase. It follows from (18), (24) and (25) that the value of studying in OHE is increased only when the wage in the HP-sector rises because the probability to find a job in the sector ( $s_1$ ) is constant. It follows from (10) and (13) that the total skilled labour force must be decreased for an increase in the wage of the HP-sector to occur. Intuitively, an expansion of ALMPs decreases the total labour flow into the HP-sector and labour stacks up either in ALMPs or the unskilled unemployment pool. This can be seen from the effect on  $u_2 + p$ . Since  $u_2 + p = 1 - m_1 - n_2 - e$ , it follows from (34), (39) and (40) that

$$\frac{d(u_2 + p)}{dp} = -\left[\frac{dm_1}{dp} + \frac{dn_2}{dp} + \frac{de}{dp}\right] > 0. \quad (41)$$

As can be seen from (40) and (41), even if the aim of ALMPs is to increase the supply of high-skilled workers, ALMPs hoard up labour in either unskilled unemployment pool or programmes and thus the supply of skilled workers decreases.

According to (33) and (40), an expansion of ALMPs decreases employment in the HP-sector, i.e.  $dn_1/dp < 0$ . This is illustrated in Figure 3. A rise in  $p$  shifts the wage-setting schedule in the HP-sector leftwards. The equilibrium moves from  $E_1$  to  $E_1^*$ . As a result, the wage in the HP-sector is increased and employment decreases there. Since employment in the LP-sector is not affected by a change in



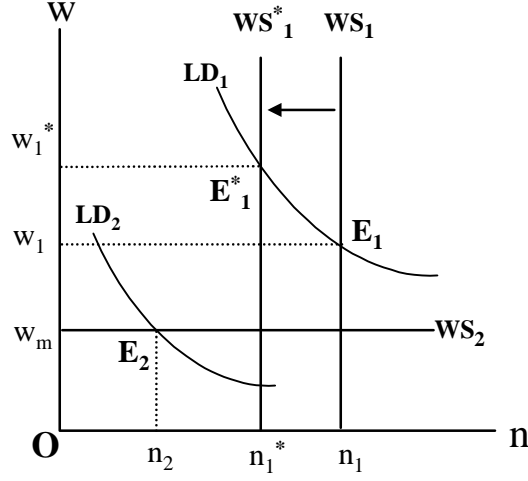


Figure 3: The effects of an expansion of ALMPs

$p$ , aggregate employment ( $n_1 + n_2$ ) is decreased. This is a *crowding-out effect* of ALMPs on regular employment.

The effect on the total number of individuals in both OHE and ALMPs (which I shall denote total education) is derived from (39) as

$$\frac{d(e+p)}{dp} = \frac{-C_3 + (C_1 + C_2 + C_4 + C_5)(\theta_{e_1} - \theta_{p_1})}{(C_2 + C_4)(a + \theta_{e_1}) + (C_1 + C_5)\theta_{e_1}}.$$

The impact on total education is in general ambiguous. However, when the probabilities of completing education are the same in both OHE and programmes, i.e.  $\theta_{e_1} = \theta_{p_1}$ , the effect on total education is

$$\left. \frac{d(e+p)}{dp} \right|_{\theta_{e_1}=\theta_{p_1}} = -\frac{C_3}{(C_2 + C_4)(a + \theta_{e_1}) + (C_1 + C_5)\theta_{e_1}} < 0.$$

In this case, the reduction in the number of students in OHE is greater than the increase in the number of participants in ALMPs and thus the net impact on total education is negative. This is related to the result above that the total skilled labour force must decrease. This occurs only when the total labour inflow into the sector is reduced. When  $\theta_{e_1} = \theta_{p_1}$ , the total labour inflow into the HP-sector is  $\theta_{e_1}(e+p)$  and thus  $e+p$  must be reduced if the inflow is to be decreased.

The effect on the total unskilled labour force can be derived from (37) and (39) as

$$\frac{dm_2}{dp} = \frac{(a + \theta_{e_1}) C_3 - a (C_1 + C_5) (\theta_{e_1} - \theta_{p_1})}{a (C_2 + C_4) (a + \theta_{e_1}) + a (C_1 + C_5) \theta_{e_1}}. \quad (42)$$

Equation (42) shows that the effect on the total unskilled labour force is in general ambiguous. However, if  $\theta_{e_1} = \theta_{p_1}$ , the total labour force in the LP-sector is increased by an expansion of ALMPs. This is because a rise in  $p$  decreases both the total labour force in the HP-sector ( $m_1$ ) and total education ( $e + p$ ).

According to (36) and (42), the sectoral employment rate in the LP-sector tends to be decreased by a rise in  $p$  when  $\theta_{e_1} = \theta_{p_1}$ . The reason is that an expansion of ALMPs increases the unskilled labour force when  $\theta_{e_1} = \theta_{p_1}$  and employment in the sector is constant. As a result, the sectoral employment rate falls.

I now turn to the effects on unemployment. Taking (33) into account, differentiating  $u_1 = m_1 - n_1$  w.r.t.  $p$  and rearranging terms give

$$\frac{du_1}{dp} = (1 - n'_1) \frac{dm_1}{dp} < 0. \quad (43)$$

Because  $dm_1/dp < 0$ , unemployment in the HP-sector falls. The reason is that the sectoral employment rate in the HP-sector is constant, and which means that unemployment must decrease proportionally to the reduction in employment there.

The effect on unemployment in the LP-sector can be written as

$$\frac{du_2}{dp} = \frac{dm_2}{dp} - \frac{dn_2}{dp} = \frac{dm_2}{dp}. \quad (44)$$

Since an expansion of programmes has no impact on unskilled employment, the effect on unemployment in the LP-sector is the same as the effect on the total labour force in the sector. As I discussed above, when  $\theta_{e_1} = \theta_{p_1}$ ,  $m_2$  is increased and thus  $u_2$  is increased.

Finally, I turn to the effect on total number of individuals in both unemployment pool and ALMPs (which I shall denote total unemployment), i.e.  $u_1 + u_2 + p$ . It

follows from (33) , (34), (39), and (40) that

$$\frac{d(u_1 + u_2 + p)}{dp} = - \left[ \frac{dn_1}{dp} + \frac{dn_2}{dp} + \frac{de}{dp} \right] > 0.$$

Total unemployment is increased by an expansion of ALMPs. This is because ALMPs have crowding-out effects both on regular employment and on regular education.

### 3.2 The effect on the aggregate profit

Since the profit of each firm in sector  $i$  is equal to  $\pi_i^* = (1 - \alpha) A_i F_i^{-\alpha} n_i^\alpha$ , the aggregate profit in sector  $i$ ,  $\Pi_i$ , can be written as  $(1 - \alpha) A_i F_i^{1-\alpha} n_i^\alpha$ . The effect on the aggregate profit in sector  $i$  can be expressed as

$$\frac{d\Pi_i}{dp} = \alpha (1 - \alpha) A_i F_i^{1-\alpha} n_i^{\alpha-1} \left( \frac{dn_i}{dp} \right). \quad (45)$$

According to (33) and (40), the aggregate profit in the HP-sector ( $\Pi_1$ ) is decreased by an expansion of ALMPs. However, (34) and (45) shows that the aggregate profit in the LP-sector ( $\Pi_2$ ) is not affected by the policy. Thus the total profits in the economy ( $\Pi_1 + \Pi_2$ ) are decreased by a rise in  $p$ .

### 3.3 The effect on the tax rate

The effect on the tax rate can be derived from (32) as

$$\begin{aligned} \frac{d\tau}{dp} = & - \frac{R_{ne} + (e + p)k}{(R_e + R_{ne})^2} \alpha w_1 \left( \frac{dn_1}{dp} \right) \\ & + \frac{R_e - (e + p)k}{(R_e + R_{ne})^2} \alpha \rho w_1 \left( \frac{u_1}{n_1} \right) \left( \frac{dn_1}{dp} \right) \\ & - \frac{R_e - (e + p)k}{(R_e + R_{ne})^2} \rho w_m \left[ \left( 1 + \frac{u_1}{n_1} \right) \left( \frac{dn_1}{dp} \right) + (1 - \gamma) \left( \frac{de}{dp} \right) \right] \\ & + \frac{k}{R_e + R_{ne}} \left( \frac{d(e + p)}{dp} \right), \end{aligned} \quad (46)$$

where  $R_e = n_1 w_1 + n_2 w_m$  and  $R_{ne} = u_1 \rho w_1 + (u_2 + e\gamma + p) \rho w_m$ . The first term in the RHS comes from the change in the labour income of the employed, i.e.  $n_1 w_1 + n_2 w_m$ . The second term is the effect via the total amount of the unemployment benefit for skilled unemployed workers, i.e.  $u_1 b_1$ . The third term in the RHS represents an effect via the total amount of compensation for non-skilled non-employed individuals, i.e.  $(u_2 + e\gamma + p) \rho w_m$ . The last term captures an effect via the cost of providing education in ALMPs and OHE, i.e.  $(e + p) k$ .

Together with the results in section 3.1, the first term and the third term in the RHS are positive, the second term in the RHS negative<sup>2</sup>, the last term in the RHS ambiguous. In total, the net impact of an expansion of ALMPs on the tax rate is in general ambiguous.

## 4 Welfare analysis of ALMPs

I shall analyse how ALMPs affect social welfare. I define social welfare in a steady state as the sum of the present values of individuals in all states and the discounted values of the aggregate profits<sup>3</sup>. The present values for individuals are weighted by the share of the population of each state. More precisely, I define social welfare as

$$W = (1 - \tau) (n_1 \Phi_{n_1} + u_1 \Phi_{u_1} + n_2 \Phi_{n_2} + u_2 \Phi_{u_2} + e \Phi_e + p \Phi_p) + \left( \frac{1 + r}{r} \right) (\Pi_1 + \Pi_2). \quad (47)$$

As can be seen from (47), a change in the size of ALMPs affects social welfare through three channels, i.e., the tax rate, the before-tax welfare of workers, and the total profit.

---

<sup>2</sup> It follows from (32) that  $R_e - (e + p) k > \tau R_e - (e + p) k = (1 - \tau) R_{ne} > 0$ . Thus the sign of the coefficient of the second term is positive.

<sup>3</sup> The discounted value of the aggregate profit in sector  $i$  can be expressed as  $\left( \frac{1+r}{r} \right) \Pi_i = \left[ 1 + \frac{1}{1+r} + \left( \frac{1}{1+r} \right)^2 + \dots + \left( \frac{1}{1+r} \right)^\infty \right] \Pi_i$ .

As I discussed in section 3.3, since it is ambiguous how an expansion of programmes affects the tax rate, the effect on social welfare via the tax rate is also ambiguous. Hence even if the effects via the before-tax welfare of workers and the effect via the total profit are unambiguous, it is unclear how an expansion of ALMPs influences social welfare in the theoretical general equilibrium framework. However, to provide some indications of the effects of ALMPs on the tax rate and social welfare, I have calibrated the model numerically. More precisely, I have examined and compared the two economies: (1) an economy with no ALMPs (henceforth denoted the E-economy); (2) an economy with ALMPs (henceforth denoted the P-economy).

## 4.1 Parameters

I have simulated the model using Swedish data from 1996. The reason for choosing this year is that general education in ALMPs (*Kunskapslyftet*) started in 1996. In reality, *Kunskapslyftet* is primarily aimed to provide high school education. However, like in the theoretical analysis, I assume that ALMPs provide higher education instead of high school education.

There are 16 parameters in my model. These parameters are calibrated as follows. The exit rate from the labour market,  $a$ , is set to 0.0176 which is the sum of the death rate for individuals aged 19-64 and the retirement rate (SCB,1996; SCB, 2000).

I calculate the quit rate ( $q$ ) from the steady state condition, i.e.  $q = s_i u_i / n_i - a$ , by using the aggregate data. The probability to find a job is equal to the reciprocal of the unemployment duration. Harkman et al. (1998) estimated the unemployment duration in 1996 to 44 weeks. Based on this value, the quit rate is set equal to 0.1036.

The parameter  $\alpha$  in the production function represents the income share of workers. I assume that the income is shared between workers and capital holders. Since the income share of capital was 0.329 in 1996 (OECD, 1998),  $\alpha$  is set equal to 0.671.

There are no data and no indicator which express the bargaining power ( $\beta$ ). However, it is well known that the Swedish unions have strong bargaining power and thus I set  $\beta$  to 0.75<sup>4</sup>.

Students in higher education receive financial support in form of grants. In 1996, this grants represented 34.8 per cent of the after-tax unemployment benefit for the low-skilled, i.e.  $\gamma = 0.348$  (CSN,1999; SCB, 2000).

The actual replacement ratio for unemployed workers,  $\rho$ , was 75 per cent of the wage of employed workers in 1996.

The rate of graduation from OHE,  $\theta_{e_1}$ , is set to 0.1104 (SCB, 1998). The ratio of the total number of new students to the total number of students in OHE,  $ax_a/e$ , was 0.232 (SCB, 1998). The steady state condition for OHE then gives  $\theta_{e_2} = ax_a/e - a - \theta_{e_1} = 0.104$ .

For participants in ALMPs, neither rate of graduation ( $\theta_{p_1}$ ) nor the drop-out rate ( $\theta_{p_2}$ ) is available. Therefore first, I have simulated the model with  $\theta_{e_1} = \theta_{p_1}$  and  $\theta_{e_2} = \theta_{p_2}$  as a benchmark. Then I assume different values of  $\theta_{p_1}$  and  $\theta_{p_2}$ , and calibrate the model under different settings.

I assume that employment in the LP-sector is 0.194, which is the share of employed workers whose education level is lower than high school (SCB,1997).

The productivity parameters,  $A_1$  and  $A_2$ , are set to 1 and 0.49, respectively. The value of  $A_2$  is chosen such that the minimum wage in the LP-sector ( $w_m$ ) is 70 per cent of the wage in the HP-sector ( $w_1$ ).

The per capita cost of providing education,  $k$ , is set to 0.37. The value of  $k$  is determined such that the ratio of the per capita cost of providing education to the per capita financial support is equal to 2.55 (SCB, 1998) when there is no ALMPs.

The discount rate ( $r$ ) is set to 0.05 (SCB, 1998).

---

<sup>4</sup> In addition to the case that  $\beta = 0.75$ , I also do the numerical experiment under different settings about  $\beta$ , i.e. 0.7, 0.8, 0.9. However, the characteristics of the results were the same as when  $\beta = 0.75$ .

		<b>e</b>	$p$	$e + p$	$n_1$	$u_1$	$n_2$	$u_2$	$u_1 + u_2$	$\tau$
<b>E</b>		0.106	—	0.106	0.586	0.0752	0.194	0.039	0.114	0.178
<b>P</b>	<b>(I)</b>	0.076	0.025	0.101	0.558	0.0717	0.194	0.076	0.147	0.205
	<b>(II)</b>	0.085	0.025	0.110	0.566	0.0727	0.194	0.058	0.131	0.201
	<b>(III)</b>	0.091	0.025	0.116	0.571	0.0732	0.194	0.046	0.120	0.199
	<b>(IV)</b>	0.096	0.025	0.121	0.576	0.0739	0.194	0.035	0.109	0.198

Table 1: The values of macroeconomic variables

I set the number of firms ( $F$ ) to 1. Since  $F$  is a scale variable, the properties of the simulation results are not affected by the level of  $F$ .

In the following section, the two economies are compared. In the E-economy the share of population in ALMPs is zero. In the P-economy 2.5 per cent of population which is equivalent to 100000 individuals in 1996 is involved in ALMPs. This is because that the aim of *Kunskapslyftet* has been to engage to support 100000 individuals in education every year (SFS,1998)

In both economies, the size of OHE is determined such that the value of being unemployed in the LP-sector ( $\Omega_{u_2}$ ) is equal to the value of OHE ( $\Omega_e$ ).

## 4.2 Numerical results

With respect to the P-economy, neither the graduate rate ( $\theta_{p_1}$ ) nor the drop-out rate ( $\theta_{p_2}$ ) is available for participants in ALMPs. As can be seen from the theoretical part, the probability to complete education ( $\theta_{p_1}$ ) is the crucial parameter in the model. I have simulated the model under the following settings: **(I)**  $\theta_{p_1}/\theta_{e_1} = 1$ ; **(II)**  $\theta_{p_1}/\theta_{e_1} = 0,7$ ; **(III)**  $\theta_{p_1}/\theta_{e_1} = 0,5$ ; **(IV)**  $\theta_{p_1}/\theta_{e_1} = 0,3$ . As to the drop-out rate from ALMPs ( $\theta_{p_2}$ ), the value of  $\theta_{p_2}$  does not affect the results significantly and thus I have calibrated the model under the condition that  $\theta_{e_2} = \theta_{p_2}$ .

Table 1 summarises the values of macroeconomic variables in the two economies.

		$\Phi_{n_1}$	$\Phi_{u_1}$	$\Phi_{n_2}$	$\Phi_{u_2} = \Phi_e$	$\Phi_p$	$\Omega_{n_1}$	$\Omega_{u_1}$	$\Omega_{n_2}$	$\Omega_{u_2} = \Omega_e$	$\Omega_p$
<b>E</b>		11.55	11.37	8.06	7.88	—	9.490	9.343	6.623	6.4731	—
<b>P</b>	<b>(I)</b>	11.74	11.55	8.13	7.99	8.97	9.336	9.191	6.466	6.3569	7.13
	<b>(II)</b>	11.68	11.50	8.11	7.96	8.60	9.331	9.186	6.478	6.3565	6.87
	<b>(III)</b>	11.65	11.47	8.10	7.94	8.30	9.327	9.183	6.483	6.3561	6.64
	<b>(IV)</b>	11.62	11.44	8.09	7.92	7.94	9.324	9.179	6.489	6.3554	6.37

Table 2: The present values of different states

As I discussed in the previous theoretical analysis, an expansion of ALMPs decreases employment in the HP-sector ( $n_1$ ), unemployment in the HP-sector ( $u_1$ ) and aggregate employment ( $n_1 + n_2$ ). As can be seen from Table 1, these values are greater in the E-economy than in the P-economy. The theoretical analysis also shows that the total number of unskilled unemployed workers and participants in ALMPs ( $u_2 + p$ ), and total unemployment ( $u_1 + u_2 + p$ ) are increased by a rise in  $p$ . This is confirmed in Table 1.

Table 1 also shows that a reduction in the probability to complete education in ALMPs ( $\theta_{p_1}$ ), i.e. moving from **(I)** in the direction of **(IV)** in the P-economy, increases skilled labour force and decreases unskilled labour force. The reason is that a decrease in  $\theta_{p_1}$  makes education in ALMPs less attractive to participants and thus the number of students in OHE ( $e$ ) is increased. As a result, total education ( $e + p$ ) is increased and thus the labour flow into the HP-sector increases. Then the total labour force, employment, and unemployment in the HP-sector are increased.

I now turn to the tax rate. Irrespective of the values of  $\theta_{p_1}$ , Table 1 shows that the tax rate is always higher in the P-economy. This is because the total amount of compensation for non-skilled non-employed individuals, i.e.  $(u_2 + e\gamma + p)\rho w_m$ , is much larger in the P-economy than in the E-economy and thus the tax rate is higher in the P-economy.



		$W$
<b>E</b>		14.44
<b>P</b>	<b>(I)</b>	14.06
	<b>(II)</b>	14.12
	<b>(III)</b>	14.16
	<b>(IV)</b>	14.20

Table 3: Social welfare

Table 2 summarises the present values of different states of workers in the two economies. In all four cases, the values of the before-tax welfare of workers in all states ( $\Phi$ ) are greater in the P-economy than in the E-economy. The reason is the following. For unskilled workers, ALMPs offer the later possibility to increase labour productivity and thus their before-tax welfare tends to increase. For skilled workers, the number of skilled workers is smaller in the P-economy and thus the wage is higher there. Therefore the before-tax welfare of skilled workers is also greater in the P-economy. However, when the tax is taken into account, the simulation shows that all present values become greater in the E-economy than in the P-economy. This implies that the negative impacts on the welfare via the tax rate are so large to exceed the positive effects of ALMPs.

Table 3 summarises the effect on social welfare. Irrespective of the values of  $\theta_{p1}$ , social welfare is lower in the P-economy. As I explained in Table 2, ALMPs increase the values of the before-tax welfare of workers. This tends to increase social welfare. However, the tax rate is higher and the total profit is smaller in the P-economy. These are the negative impacts on social welfare. The simulation shows that with my assumptions the negative effects of programmes on social welfare are so large as to exceed the positive impacts of programmes.

## 5 Concluding remarks

The paper has analysed the general equilibrium effects of ALMPs providing general education. An expansion of ALMPs crowds students out of ordinary education. When the probabilities of completing education are the same in ordinary education and ALMPs, this crowding-out effect is so large as to decrease total education.

ALMPs also have a crowding-out effect on regular employment. This is because an expansion of ALMPs hoards up labour in either unskilled unemployment pool or programmes and decreases the labour flow into the skilled sector. As a result, the total skilled labour force is decreased. This tends to increase the wage in the skilled sector and thus employment decreases there. In the unskilled sector, since the wage is given by the legislated minimum wage, the wage and employment are not affected. Hence aggregate employment is decreased by an expansion of programmes. Total unemployment tends to increase.

ALMPs affect social welfare through three channels: the tax rate, the before-tax welfare of workers, and the total profit. The net effect of ALMPs on social welfare is in general ambiguous. To provide some indications of the effect of ALMPs on social welfare, I have calibrated the model numerically. I compare an economy with ALMPs and one without. The simulation shows that the tax rate is lower in the economy with no programmes because the total expenditure on non-employed individuals is smaller. However, the before-tax welfare for all workers are greater in the economy with programmes. For unskilled workers, ALMPs offer the later possibility to increase labour productivity and thus the welfare of unskilled individuals tends to increase. For skilled workers, the number of skilled workers is smaller in the economy with ALMPs and thus the wage is higher there. Thus the before-tax welfare of skilled worker is also larger in the economy with ALMPs. But the negative welfare effects of higher taxes in an economy with ALMPs dominates the positive before-tax effects for workers. Net social welfare will be lower in an economy with

ALMPs providing general education than in an economy without such programmes.

## References

- [1] Alogoskoufis, G., C. Bean, G. Bertola, D. Cohen, J. Dolado, and G. Saint-Paul, 1995, *Unemployment: Choices for Europe*, Monitoring European Integration Series, Vol. 5 London Center for Economic Policy Research
- [2] Brown, C., 1999, Minimum Wage, Employment, and the Distribution of Income, *Handbook of Labor Economics*, Ch. 32 (North-Holland)
- [3] Calmfors, L., A. Manning and G. Saint-Paul, 1998, A Balanced Approach to Employment Policy in Europe, London: HM Treasury
- [4] Card, D. and A. B. Krueger, 1995, *Myth and Measurement : The New Economics of the Minimum Wage* (Princeton University Press)
- [5] CSN, 1999, *Student Financial Aid (Studiestöd) 1997/98*, Stockholm
- [6] European Commission, 1996, *Labour Market Studies - Sweden*, Luxembourg
- [7] Fukushima, Y., 1998, Active Labour Market Programmes and Unemployment in a Dual Labour Market, *Research Papers in Economics* 1998:2, Stockholm University
- [8] Hamermesh, D., 1993, *Labor Demand* (Princeton University Press)
- [9] Harkman, A., M. Klingvall, F. Jansson, S. Okeke, and L. Öhrn, 1998, 90-talets arbetsmarknad, AMS, Ura 1998:5
- [10] Lindbeck, A., 1995, *The Swedish Experiment* (SNS Förlag)
- [11] Manning, A. 1991, The determinants of wage pressure: some implications of a dynamic model, *Economica*, Vol. 58
- [12] Manning, A. 1993, Wage bargaining and the Phillips curve: the identification and specification of aggregate wage equations, *Economic Journal* 103
- [13] Modigliani, F., J. - P. Fitoussi, B. Moro, D. Snower, R. Solow, A. Steinherr, and P. Stylos-Labini, 1998, An Economist's Manifesto on Unemployment in the European Union, *Banca Nazionale del Lavoro Quarterly Review* 51
- [14] OECD, 1994, *Jobs Study: Evidence and Explanations Part II: The Adjustment Potential of the Labour Market*, Paris

- [15] OECD, 1998, *Economic Outlook*, June, Paris
- [16] SCB, 1996, *Befolkningsstatistik del 4*, Sweden
- [17] SCB, 1997, 1998, 2000, *Statistical Yearbook of Sweden (Statistisk Årsbok)*, Sweden
- [18] SFS (Svensk Författningssamling, Studiestödsförordning), 1998:276
- [19] Wadensjö, E., 1987, Labour Market Policy and Employment Growth in Sweden, *Labour* 1